NATIVE BIRDS OF LANAI, HAWAII

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The island of Lanai is a pear-shaped shield volcano, covering 361 km2, the sixth largest of the Hawaiian Islands. At its extremes, the island is 29 km long and 21 km wide, with the highest point at Lanaihale, 1027 m (Figure 1; Armstrong 1973). Mean annual rainfall varies from 25 cm along the coast to 89 cm near the summit (Armstrong 1973), although a substantial quantity of water, estimated to be as much as the annual rainfall, is directly intercepted from the cloud cover by the vegetation in the upper mountain areas (Ekern 1964).

I did a field study of bird species distribution and relative abundance on Lanai from August 1975 until November 1976. I conducted surveys and transect counts during this period to provide data for the United States Department of Agriculture Hawaiian Fruit Flies Laboratory to use in assessing possible effects of their Lanai fruit fly eradication program on nontarget animals. Most of the avian species now found on Lanai are introduced; however, some native birds are still present. Accounts on the native species follow.

ISLAND OF LANAI

A native forest may have once covered most of Lanai, but by the early 1900s cattle, sheep and feral goats had destroyed it (Perkins 1903, Rothschild 1893-1900, Wilson and Evans 1890-1899). Presently the native forest covers less than 7% of the island area (Armstrong 1973).

Today the principal forested area on Lanai is the mountain region, with a great deal of the vegetation consisting of introduced Molassas Grass *(Melinis minutiflora)*, guava *(Psidium* sp.*)*, eucalyptus *(Eucalyptus* sp.*)*, Christmas berry *(Schinus terebinthifolius)* and Norfolk Island Pine *(Araucaria heterophylla)*. The native ohia-lehua *(Metrosideros collina)* and false staghorn fern, or uluhe, *(Dicranopteris* sp.*)* are significantly found only above elevations of 610 m. Since the 1920s most of the central plateau has been in Pineapple *(Ananas comosus)* production, occupying about 20% of the island (Armstrong 1973). Lanai City, where most of the population of 2,200 reside, and Lanai Airport are strategically located on the plateau. About the only area on the plateau not under Pineapple cultivation is Kanepuu, which has remnants of a dry native forest that possibly once covered much of that section of Lanai. The coastal areas of the island are covered by introduced Koa Haole *(Leucaena leucocephala)* and Kiawe (a mesquite, *Prosopis pallida*) on the southern and western half and a wind-swept grassy range and coastal belt of Kiawe on the northern and eastern half. Rather extensive wind-eroded areas are found in many sections of Lanai, especially in the north end.

The coastline is divided into a Pali Coast on the south and west half from Kamaiki Point to Kaena Point and a Beach Coast along the north and east half. The Pali Coast is dominated by 22 km of sea cliffs, reaching heights greater than 305 m at Kaholo Pali (Armstrong 1973). Sea caves, arches and stacks are found along this coast. The Beach Coast, on the other hand, is low and flat, with broad expanses of alluvium and beaches and no appreciable sea cliffs. Polihua and Hulopoe have extensive white-sanded beaches; Manele-Hulopoe and Kaumalapau are the recreation and harbor centers of Lanai.

LANAI AVIAN HISTORY

Although the native forest of Lanai was much reduced by 1900, the birdlife was still considered abundant (Munro 1960, Perkins 1903), with a petrel, owl, thrush and six members of the endemic Hawaiian Honeycreeper family *(Drepanididae)* nesting on the mountain. However, by the 1930s the native avifauna had been virtually eliminated, and until recently only three species were considered present. A fourth, the Dark-rumped Petrel, was rediscovered on Lanai during this study.

Extinct birds include races of the Thrush *(Phaeornis obscurus lanaiensis)*, Creeper *(Loxops maculata montana)* and Akialoa *(Hemignathus obscurus lanaiensis)*, and populations of Ou *(Psittirostra psittacea)* and Iiwi *(Vestiaria coccinea)*. The Lanai Thrush was common in the mountain forest, especially at the north and south ends, until the 1920s. It declined in numbers after 1923 (Munro 1960), although it was still considered "not uncommon" as late as 1934 (Munro *in* Gregory 1935). The Lanai Creeper was common from about 460 m elevation to Lanaihale in the 1890s (Perkins 1903, Rothschild 1893-1900, Wilson and Evans 1890-1899), but scarce by the 1930s, with the last sighting of a pair in 1937 (Munro 1960). The Lanai Akialoa inhabited the upper mountain forest region and was rare even in the late 1800s, with the last definite sighting of an individual in 1894 (Perkins 1903, Rothschild 1893-1900). The Ou was quite common on Lanai in the 1890s but probably disappeared around 1932 (Munro 1960). Similarly, the Iiwi was considered abundant throughout the island forest in the 1890s (Perkins 1903), still fairly common up to 1923, but extirpated by 1929 (Munro 1960).

The causes of bird extinctions on Lanai are not definitely known, but are believed to include mosquito-borne avian diseases from birds, especially poultry, introduced with the establishment of the Pineapple plantation in the 1920s (Munro 1960), the destruction of the native mountain forest (Greenway 1967), and, to a limited extent, predation by feral cats *(Felis catus)* and pigs *(Sus scrofa)* (Munro 1960, Perkins 1903, Rothschild 1893-1900).

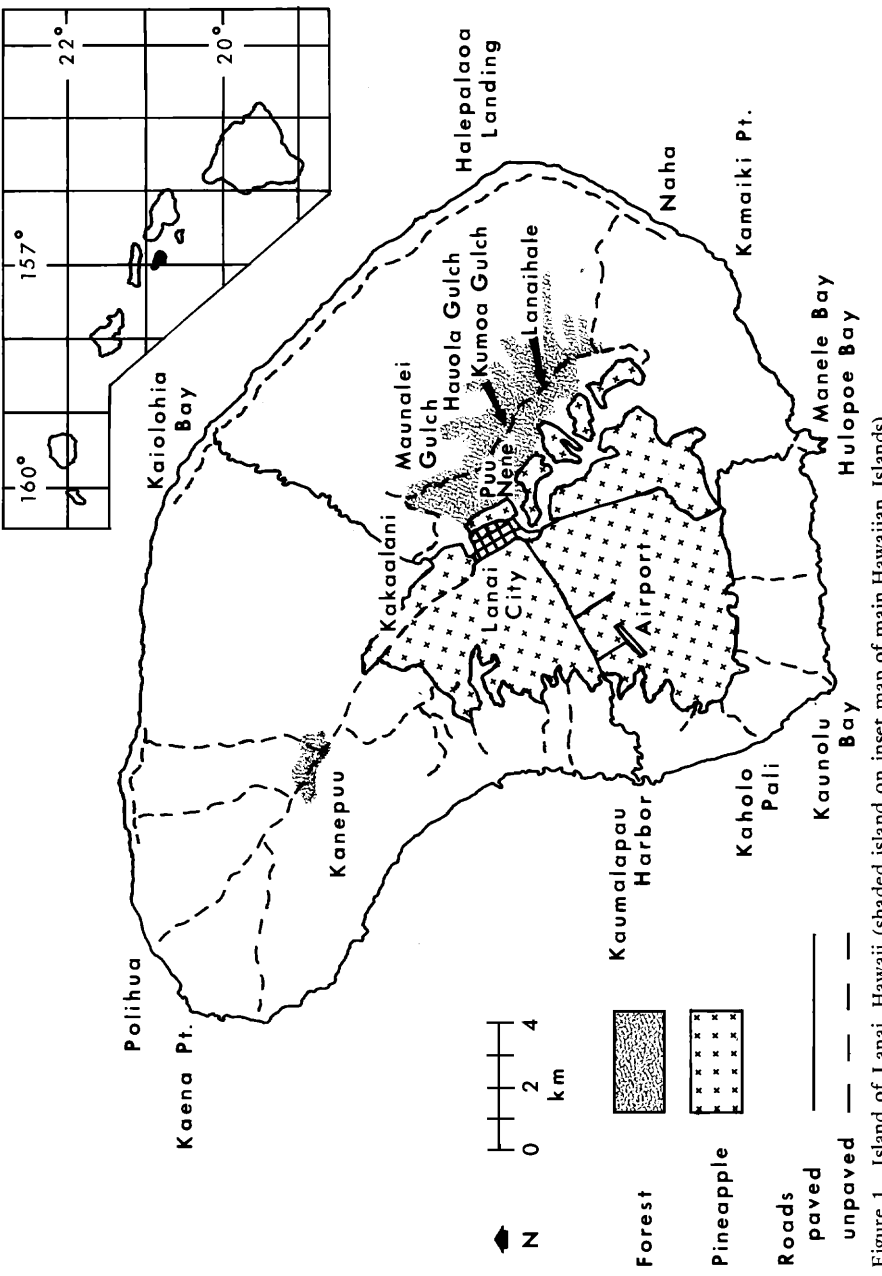

Figure 1. Island of Lanai, Hawaii (shaded island on inset map of main Hawaiian Islands).

EXTANT NATIVE SPECIES

WEDGE-TAILED SHEARWATER, *Puffinus pacificus chlororhynchus*. This race nests in Hawaii on the Northwestern Islands, offshore islands, Kauai and probably Niihau (Berger 1972). On Lanai a small colony, numbering from 5 to 10 birds, probably nests on Puupehe Island, a sea tower about 25 m high and 20 m in diameter, 45 m off of the point between Manele and Hulopoe Bays. In June and July 1976, at and after sunset, I observed light-phase Wedge-tailed Shearwaters flying low over the water toward the islet, circling the rock and landing on the grassy top. In August 1976 I saw a chick in a hole located near the top of Puupehe Island. By mid-September 1976 shearwater activity around the rock had ended. Other seabirds, notably the Bulwer's Petrel *(Bulweria bulwerii)*, may also nest on the island, but their presence there could not be verified because of the difficulty in reaching the islet. Other islets and stacks dot the Pali Coast and may also provide nesting grounds for this shearwater.

DARK-RUMPED PETREL, *Pterodroma phaeopygia sandwichensis*. This endangered Hawaiian race formerly nested on most of the main islands, but is now considered restricted to Maui and Hawaii (Berger 1972). The population on Lanai was believed extirpated by pigs and cats (Munro 1960), but night field work from June to October 1976 confirmed the presence of the Dark-rumped Petrel in the mountain forest (Hirai 1978). A possible colony, estimated from calls and sightings to be about 100 individuals, was located in June 1976 at an elevation of 850 m at Kumoa Gulch. Although I found no burrows, the petrels probably nest on the ridge slopes, which are covered by uluhe fern and ohia-leuha. From the available information, the breeding season of the Dark-rumped Petrel on Lanai seems to be similar to that of the population in Haleakala Crater, Maui, beginning in May and extending until November.

WHITE-TAILED TROPICBIRD, *Phaethon lepturus dorotheae*. This seabird is known to nest regularly in Hawaii only on Hawaii, Maui, Kauai and a few of the offshore islands (Berger 1972). On Lanai I noticed this tropicbird in all months of the year along the Pali Coast and in Maunalei and Hauola gulches. It probably also inhabits other gulches on the northeast side of the mountain. At one time I counted as many as 16 individuals in the gulches or against the sea cliffs. I found no nests during this study, but I observed adults landing on ledges or entering holes in cliffs along the coast and in the gulches in October 1975, from late February through early June 1976 and in August 1976. The remains of two young, feathered and lacking streamers, were found in Maunalei Gulch in August 1975. From these observations, the breeding season of the White-tailed Tropicbird on Lanai is prolonged and possibly year-round.

RED-TAILED TROPICBIRD, *Phaethon rubricauda rothschildi*. This tropicbird breeds on the Bonin and Hawaiian islands, most commonly in Hawaii on the Northwestern Islands (Berger 1972). On Lanai I found Red-tailed Tropicbirds along the Pali Coast, nesting in holes in the high sea cliffs from February through August 1976. Usually I saw only one or two individuals at one time but on 9 June 1976, near Kaholo Pali, I counted as many as 10 adults against the sea cliffs and over the ocean. I noted no Red-tailed Tropicbirds in the gulches on the island.

WHITE-CAPPED NODDY, *Anous tenuirostris*. This tern nests in Hawaii on the Northwestern Islands, offshore islands, and at least on the coasts of Maui and Hawaii (Berger 1972). On Lanai a colony of up to 30 light phase individuals probably nests and/or roosts year-round in sea caves or on the high cliffs at Kaneapua, a point of land adjacent to Kaunolu Bay. I also saw a few individuals in the Hulopoe-Manele area, and other colonies of White-capped Noddies may exist along the Pali Coast.

I noted other seabird species along the coast of Lanai. Solitary Brown Boobies *(Sula leucogaster)* and Great Frigatebirds *(Fregata minor)* were observed along the Pali Coast. Terns (probably Sooty, *Sterna fuscata*) and noddies (probably Common, *Anous stolidus*) were noticed out at sea flying low over the water in the direction of Oahu. The Black-crowned Night Heron *(Nycticorax nycticorax hoactli)* was occasionally seen on Lanai and the species is probably a regular, though infrequently noticed, visitor from nearby Maui.

AMERICAN GOLDEN PLOVER, *Pluvialis dominica fulva*. This Pacific race is the most common of the migratory shorebirds on Lanai, found from sea level to Lanaihale. Although a few birds remained on the island the whole year, most of the plovers departed for the nesting grounds in Siberia and arctic America by early May and started to return in mid-July. On the nine-hole city golf course I found plover numbers increasing from less than 5 birds in June to over 30 from October through April. In the mountain forest, I noted plovers on the unpaved road.

RUDDY TURNSTONE, *Arenaria interpres*. This shorebird appears to have a migratory cycle similar to that of the American Golden Plover. I observed flocks of up to 15 turnstones in tilled Pineapple fields and along the coastline, especially from Kaiolohia Bay to Halepalaoa Landing in every month of the year except June.

BRISTLE-THIGHED CURLEW, *Numenius tahitiensis*. This bird is a regular migrant from western Alaska to the Northwestern Hawaiian Islands and, in smaller numbers, to the main islands (Berger 1972). On 18 July 1976 I saw a Bristle-thighed Curlew on the sandy beach at Polihua.

WANDERING TATTLER, *Heteroscelus incanus*. I found this winter resident along the rocky shores, regularly at Puupehe Island, the Kaunolu

Bay area, from Kaiolohia to Halepalaoa Landing and at Naha. I saw a few solitary tattlers on Lanai throughout the year.

SANDERLING, *Calidris alba*. On Lanai this shorebird occurred commonly in flocks of up to five individuals along the sandy shores of the Beach Coast, especially from Kaiolohia Bay to Halepalaoa Landing, from mid-July through April.

SHORT-EARED OWL, *Asio flammeus sandwichensis*. This owl is distributed on all the main Hawaiian Islands in a wide range of habitats (Berger 1972). On Lanai I found Short-eared Owls in the grasslands on the northern and eastern sides of the island, Kanepuu, in or near the Pineapple fields, and over the mountain forest. The population size on the island could be termed common, with the species apparently in no immediate danger of being extirpated. Nesting information on this owl in Hawaii is scant, and it may breed throughout the year, depending on the food supply (Berger 1972, Munro 1960). In June and October 1976 I found young in the Kakaalani area, a Molassas Grass habitat.

AMAKIHI, *Loxops virens*. This species inhabits all of the main Hawaiian Islands, divided into four subspecies found on Kauai, Oahu, Maui-Molokai-Lanai, and Hawaii. It is believed to be the second most common of the surviving honeycreepers (Berger 1972). The Lanai population *(L. v. wilsoni)* was considered common before the 1920s, but then declined in numbers, possibly due to introduced bird diseases (Munro 1960). More recently it has been said to be rare (Berger 1972). During this study I briefly observed this bird in late February 1976 between Hauola and Maunalei gulches. For a few minutes I saw one Amakihi and heard a second in a Norfolk Island Pine. On no other occasion did I encounter Amakihi, raising the possibility that the population on Lanai may be close to extirpation.

APAPANE, *Himantione sanguinea*. A single species inhabits six of the main Hawaiian Islands and is believed to be the most common of the surviving species of honeycreepers (Berger 1972). This bird was considered rather abundant in the Lanai forest in the 1890s (Perkins 1903), but by the mid-1930s only a few remained (Munro 1960). I found Apapane mainly in the native mountain forest, although I noted occasional individuals in introduced vegetation at lower mountain elevations. Apapane were most common between Hauola and Maunalei gulches and at Puu Nene. During this study I found no nests, but I saw immature individuals in January and April 1976 in the Puu Nene and Maunalei-Hauola areas respectively. There have been speculations of interisland flights by Apapane (Berger 1972) and it may be that such movements have previously restocked the population on Lanai. However, today the Apapane population on the island seems stable and viable, although numbers are small and will probably never exceed the very low hundreds due to the quality and quantity of the native forest.

SUMMARY

Based on field work conducted from August 1975 until November 1976, species accounts of the native birds on Lanai are given. Five migratory shorebird species and eight native nesting species were found on Lanai. The migratory shorebirds were mainly distributed along the coastline in the nonsummer months, with American Golden Plovers and Ruddy Turnstones also noted in the Pineapple fields. White-tailed and Red-tailed tropicbirds, Wedge-tailed Shearwaters and White-capped Noddies were present and evidently breeding along the Pali Coast. White-tailed Tropicbirds were also observed in the gulches on the northeast side of the island. Short-eared Owls were common over much of Lanai, and a small but viable population of Apapane was found in the native mountain forest. Amakihi were seen only once in the mountain forest and the island population may be on the verge of extirpation. The Dark-rumped Petrel was rediscovered during this study, probably nesting in the mountain forest.

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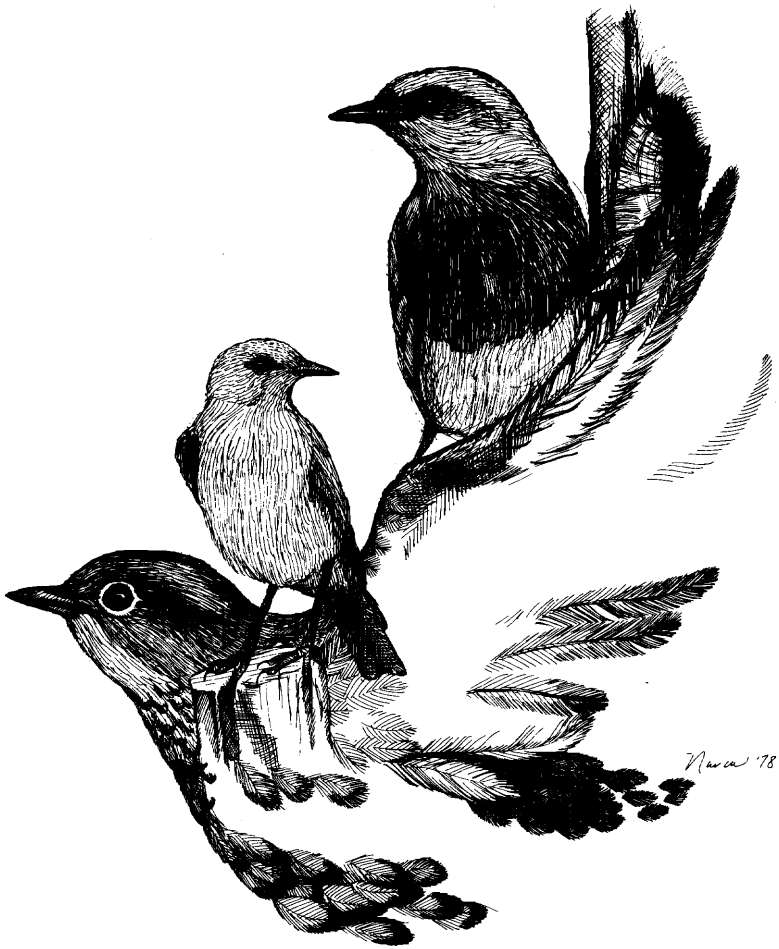

Sketch by Narca Moore